

Time: 3 hours

Max. Marks: 80

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- Note:** 1. Q1 is compulsory
2. Solve any three from remaining.
3. Assume suitable data if necessary
4. Figures to the right indicate full marks

- Q1. Solve any Four** **20**
- A Explain significance of material selection in vibration isolation
 - B Explain dynamic vibration neutralizers.
 - C Role of Coulomb damping in vibration isolation systems
 - D Define Resonance
 - E Gyroscopic vibration absorbers
 - F Explain two stage isolators
- Q2.**
- A Derive the equation for the stiffness of a single-acting air spring using relevant assumptions. **08**
 - B Define the concept of negative stiffness in vibration isolation. **12**
- Q3.**
- A Describe the working principles of an impact absorber and how it mitigates forces. **10**
 - B Explain transmissibility characteristics for various isolators. **10**
- Q4.**
- A Explain how the Quarter-Car model helps in designing better suspension systems for automobiles. **10**
 - B Describe the various methods of vibration control. Compare and contrast at least two methods in terms of their effectiveness and application scenarios. **10**
- Q5.**
- A Describe the operational principles of three-element isolators. How do they differ from traditional isolators, and what are their advantages in terms of vibration control. **10**
 - B Explain self-tuned pendulum neutralizer. **10**
- Q 6.**
- A Differentiate between classical control and optimal control **10**
 - B Discuss Adaptive Passive Vibration Absorber (APVA). **10**
